

REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-23 are pending in the present application. Claim 1 has been amended and Claims 13-23 have been added by the present amendment.

In the outstanding Office Action, Claims 3 and 6-12 were withdrawn from further consideration by the Examiner; the title was objected to; Claims 1 and 2 were rejected under 35 U.S.C. §102(b) as anticipated by Taguchi; Claims 1 and 4 were rejected under 35 U.S.C. §102(b) as anticipated by Hall; and Claim 5 was indicated as allowable if rewritten in independent form.

Applicants thank the Examiner for the indication of allowable subject matter. In light of this indication, new Claims 13-14 have been added. In particular, new Claim 13 corresponds to Claim 5 rewritten in independent form, and new Claim 14 depends on Claim 13 and corresponds to original dependent Claim 2.

Claims 1 and 2 stand rejected under 35 U.S.C. §102(b) as anticipated by Taguchi. This rejection is respectfully traversed.

The present invention as recited in Claim 1 is directed to a semiconductor device including an element isolation film formed to have a predetermined depth from a main surface of a semiconductor substrate and in which the isolation film divides the area from the main surface to the depth into a plurality of first regions. Further, the device includes first wells formed in a first region and a second well formed in a second region deeper than the first wells. Claim 1 has also been amended to recite the second well is in contact with some of the wells to provide electrical connection therebetween and is not in contact with the first wells adjacent to some of the first wells.

This feature is supported at least by Figure 24, for example, which illustrates a p-type second well W2 in contact with a plurality of p-type first wells W1 to allow the plurality of p-type first wells W1 to be electrically connected to each other, while the p-type second well W2 is not in contact with the n-type first wells W1 placed adjacent to the p-type first wells W1. Thus, the p-type first wells W1 and the n-type first wells W1 are completely electrically separated from each other by an element isolation film T.

This produces an advantage of allowing a designer of a semiconductor device to arbitrarily determine an impurity concentration for the p-type and n-type first wells W1. Further, Figure 2 also illustrates a structure where an n-type second well W2 is placed adjacent to the p-type second well W2. In addition, the p-type second well W2 is not in contact with the n-type first wells W1 and the n-type second well W2 is not in contact with the p-type first wells W1. Thus, it is also possible to arbitrarily determine an impurity concentration of the p-type and n-type first wells W1.

The outstanding Office Action states Taguchi teaches the claimed invention. However, as clearly shown in Figure 3 of Taguchi, the second well 12a is in contact with the first well 73 placed adjacent to the second well 12a. Accordingly, the semiconductor device of the present invention differs from that disclosed in Taguchi.

Accordingly, it is respectfully submitted Claim 1 and each of the claims depending therefrom patentably define over Taguchi.

Claims 1 and 4 stand rejected under 35 U.S.C. §102(b) as anticipated by Hall. This rejection is respectfully traversed.

Hall also fails to teach or suggest the claimed invention. In more detail, Hall does not teach or suggest any element equivalent to the recited second well which is in contact with some of the first wells to provide electrical connected therebetween.

Therefore, it is respectfully submitted that Claim 1 and each of the claims depending therefrom also patentably define over Hall.

In addition, new Claims 15-23 have been added to set forth the invention in a varying scope. Applicants submit the new claims are supported by the originally filed specification. Arguments will now be presented distinguishing these claims over the applied art.

New independent Claim 15 corresponds to Claim 2 rewritten in independent form. In particular, new Claim 15 recites the first and second wells of the first and second regions on one side with reference to a predetermined boundary area are of a first conductivity type, and the first and second wells on the other side are of a second conductivity type. Taguchi and Hall do not teach or suggest deep wells formed in an n region and a p region, respectively. This differs from the present invention in which an n region and a p region have deep wells formed therein, respectively, so that respective first wells in the n region and the p region can be electrically connected as shown in Figure 2, for example, between which conduction is achieved at a high speed.

Accordingly, it is respectfully submitted independent Claim 15 also patentably defines over both Taguchi and Hall.

Further, new Claim 16 is similar to Claim 1, but recites a plurality of element isolation films formed to have a predetermined uniform depth from a main surface of a semiconductor substrate. It is respectfully submitted Hall and Taguchi also do not teach or suggest these features. In addition, new Claims 17-19 depend on Claim 16, and correspond to original Claims 2, 4 and 5, respectively. Additionally, new Claims 20-23 depend on independent Claims, 1, 13, 15 and 16, respectively, and recite that each of the first wells has a single element formed therein.

Consequently, in light of the above discussion and in view of present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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IN THE TITLE

Please delete the title in its entirety and substitute therefor:

--SEMICONDUCTOR DEVICE INCLUDING A WELL DIVIDED INTO A
PLURALITY OF PARTS BY A TRENCH--

IN THE CLAIMS

Please amend Claim 1 as follows:

1. (Amended) A semiconductor device comprising:

a semiconductor substrate;

an element isolation film formed such as to have a predetermined depth from a main surface of said semiconductor substrate, said element isolation film dividing the area from said main surface to said depth into a plurality of first regions;

first wells formed in said first regions, respectively; and

a second well formed in a second region deeper than said first wells in said semiconductor substrate, said second well being in contact with some of said first wells to provide electrical connection therebetween and not being in contact with said first wells adjacent to said some of said first wells.

Claims 13-22 (New).

IN THE ABSTRACT OF THE DISCLOSURE

Please amend the abstract disclosure at page 29, lines 1-10 as follows:

[Provided are a] A semiconductor device [in which] including a well [is] divided into a plurality of parts by a trench, to effect a reduction in layout area, and a manufacturing method thereof. In the semiconductor device, an element isolation film [(T)] is formed such as to have to a depth [(L1)] from the main surface of a semiconductor substrate [(100)], and the area from the main surface of the substrate [(100)] to the depth [(L1)] is divided into a plurality of first regions [(R1)]. A first well [(W1)] is formed in each of the first regions [(R1)]. A second well [(W2)] is formed in a second region [(R2)] deeper than the first well [(W1)] in the substrate [(100)], and the second well [(W2)] is in contact with some of the first wells [(W1)].